

Robust Sensor for In-Flight Flow Characterization, Phase I

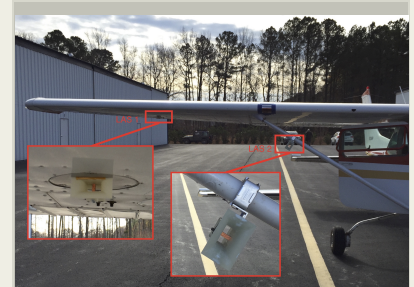
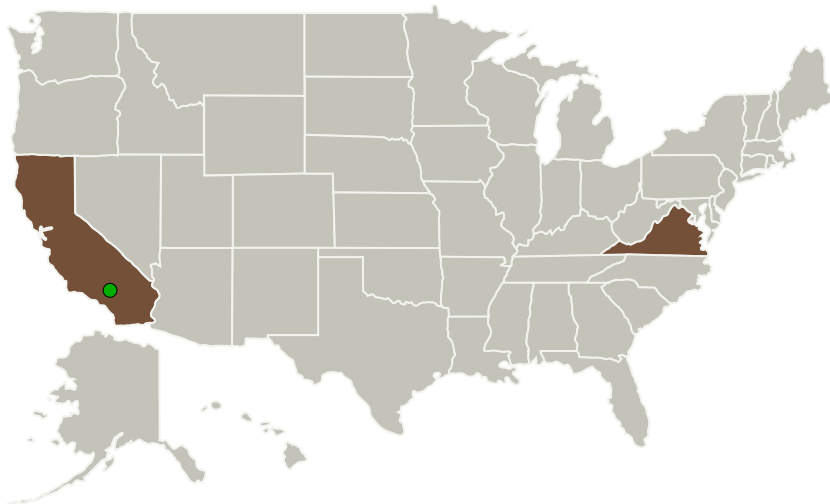
Completed Technology Project (2015 - 2015)



Project Introduction

Tao Systems proposes to develop a sensor system providing quantitative in-flight boundary layer flow characterization with fast response, low volume, minimal intrusion, high accuracy and robustness to weather conditions. Aviation loss of control (LOC) accidents often results from stalls and uncertain weather/flow conditions, often at low altitudes e.g., take-off/landing. We propose to develop a robust sensor system to assess stall conditions and surface boundary layer phenomena through the use of a low-weight system consisting of surface flow sensors that: (1) use a robust transduction mechanism, (2) is operable under adverse weather conditions, e.g., rain, (3) has a one-time lifetime calibration with a minimal maintenance schedule, (4) provides monotonic output with speed and flow angle, and (5) relatively insensitive to environmental parameters such as flight altitude, pressure, temperature, and density. This technology increases sensor robustness as output for control feedback for a wide range of flight regimes and flow conditions.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Tao of Systems Integration, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Hampton, Virginia
● Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California

Primary U.S. Work Locations

California	Virginia
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Project Transitions

▶ **June 2015:** Project Start

✓ **December 2015:** Closed out

Closeout Summary: Robust Sensor for In-Flight Flow Characterization, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/139417>)

Images

**Briefing Chart Image**

Robust Sensor for In-Flight Flow Characterization, Phase I

(<https://techport.nasa.gov/image/128233>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Tao of Systems Integration, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

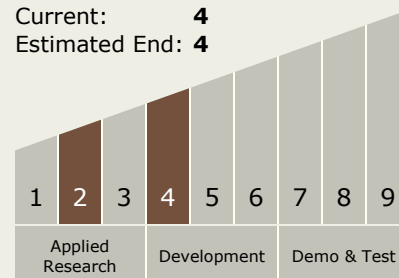
Carlos Torrez

Principal Investigator:

Arun Mangalam

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.4 Environment Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System